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(71) Applicant (for all designated States except US): ECOLE POLYTECHNIQUE FEDERALE DE LAUSANNE (EPFL) [CH/CH]; CM-Ecublens, CH-1015 Lausanne (CH).

(72) Inventors; and

(75) Inventors/Applicants (for US only): KOUKAB, Adil [MA/CH]; Chemin de la Moraine 19A, CH-1162 Saint-Prex (CH). DECLERCQ, Michel [CH/CH]; Chemin de Mont-Blanc 2, CH-1303 Penthaz (CH).

(74) Agent: LEMAN CONSULTING S.A.; WENGER Joel, Route de Clémenty 62, CH-1260 Nyon (CH).

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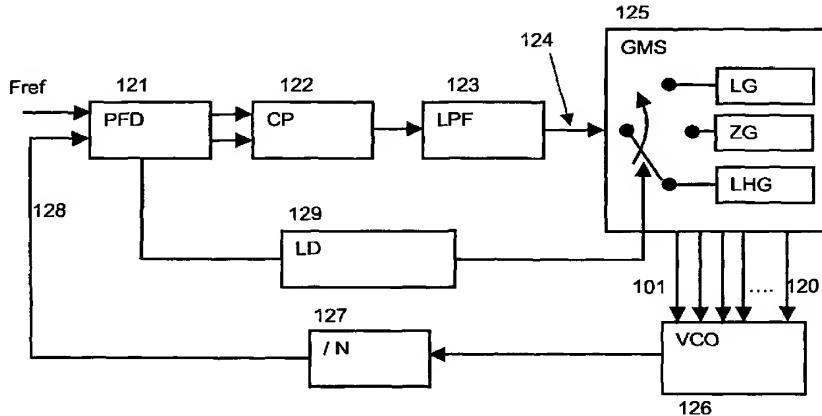
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(54) Title: ANALOGUE SELF-CALIBRATION METHOD AND APPARATUS FOR LOW NOISE, FAST AND WIDE-LOCKING RANGE PHASE LOCKED LOOP



(57) **Abstract:** A method and apparatus for a fast and automatic setting of the phase locked loop (PLL) output frequency that significantly improves linearity, locking range as well as spectrum purity, jitter and phase noise performances is disclosed. In one embodiment, a PLL frequency synthesizer is disclosed having a reconfigurable voltage controlled oscillator VCO with three modes of operation: a Linear-High-gain, Zero-gain, and Low-gain mode. During a first tuning operation, the VCO work in a linear high gain mode, enabling a totally analogue self-calibration of the PLL over a wide frequency tuning range and with a fast settling time. During this operation the control voltage at the input of the VCO is varied by the PLL until the appropriate output frequency is found. A method for providing a linear variation of the frequency over all the voltage tuning range during this mode is disclosed. When the loop is locked, the VCO is automatically switched to the Zero-gain mode while keeping its frequency unchanged. Its sensitivity to the noise in the control path is then practically eliminated and its phase noise performances significantly improved. If the frequency error and phase noise are sufficiently small for the considered application the tuning is stopped. If the error and phase noise are not sufficiently small the VCO is switched again to Low-gain mode and fine-tuning adjustment of the output frequency is achieved.

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